WATER QUALITY REPORT

Prepared for:

Lawson Valley Road Bridge Replacement Project
County of San Diego

Prepared By:
Nolte Associates, Inc.
15070 Avenue of Science, Suite 100
San Diego, CA 92108

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NOLTE
BEYOND ENGINEERING

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INTRODUCTION

The purpose of this Water Quality Report (WQR) is to address the potential water quality impacts caused by the proposed Lawson Valley Road Bridge Replacement Project and evaluate the proposed best management practices (BMPs) that will be implemented to protect water quality. The project includes replacing the existing structurally-deficient precast slab-over-steel stringers bridge with a wider and longer reinforced concrete bridge and roadway. This WQR was prepared in accordance with The County of San Diego Watershed Protection, Stormwater Management, and Discharge Control Ordinance (Section 67.817), and also utilized guidance from the *County of San Diego Standard Urban Storm Water Mitigation Plan For Land Development and Public Improvement Projects (March 24, 2008),* the 2002 Clean Water Act Section 303(d) List of Water Quality Limited Segment, U.S. Department of Transportation- Federal Highway Administration *Technical Advisory T 6640.8A (October 1987)*, the CALTRANS *Standard Environmental Reference (July 2004)*, and the *Water Quality Control Plan for the San Diego Basin (September, 1994).*

1.0 PROJECT DESCRIPTION

The Lawson Valley Road Bridge is located in the vicinity of Jamul, approximately two miles south of Loveland Reservoir, in the County of San Diego. The project site is situated approximately 221 meters (725 feet) west of Montiel Truck Trail on Lawson Valley Road, where the two-lane concrete bridge spans the Lawson Valley Creek (see Figure 1). The existing structure will be replaced by a wider bridge and approach roadway that meets all current design standards.

The recommended replacement bridge will be a cast-in-place, post-tensioned concrete slab bridge with seat type abutments on spread footings. The replacement bridge will be measure 32 feet-8 inches in width and approximately 63 feet in length.

The proposed improvements also involve grading existing slopes, realignment of the roadway over Lawson Creek and installation of concrete wingwalls and rock slope protection. Additionally, the existing bridge abutments and rip-rap will be removed from the site.

This bridge replacement project qualifies for Federal funding under the Highway Bridge Replacement and Rehabilitation (HBRR) Program. The existing bridge is structurally deficient and does not have adequate capacity to convey flood flows. The selected design must meet the requirements, regulations, and policies set by the Federal Emergency Management Agency (FEMA), and the Executive Order 11988 (Federal Policy on Flood Plain Management), including:

(1) Conveyance of the base flood, Q100

(2) Backwater caused by the bridge encroachment with that caused by all other obstructions is limited to 0.3 meters (1 foot) above the surface of the base flood.

1.1 Topography and Land Use

The project area is characterized by a variety of grasses, trees and shrubs. The channel immediately upstream of the bridge has steeply banked walls and several rock outcrops. The channel underneath the bridge and immediately downstream is covered with pebbles and gravel. Ground surface elevations vary by several meters (several feet) from upstream of the bridge to downstream, although the riverbed is not steeply sloped under the bridge.

The area around the site is currently a mixture of undeveloped and some residential development, and Lawson Valley Road and the bridge are the only existing structures within the Project Impact Area (PIA). Rock slope protection (rip-rap) is present on both sides of the bridge to protect the existing embankments. Stormwater drains from the roadway and bridge through natural slopes and overside curb drains present on each end of the bridge. Current ground surface elevations in the river channel vary from approximately 530 meters (1739 feet) upstream from the bridge to approximately 528 meters (1732 feet) downstream from the bridge. The river runs south to north under the bridge, and there was water present in the riverbed during a July 2005 site visit. The attached photos show the areas upstream and downstream of the bridge.

1.2 Hydrologic Unit Contribution

The proposed site is located in the Jamacha hydrologic subarea (909.21) of the Middle Sweetwater hydrologic area in the Sweetwater hydrologic unit. See the attached Figure 1 for the approximate project location and Figure 2 for the regional hydrologic subareas. The site is approximately 35.4 kilometers (22.0 miles) from the nearest 303(d) impaired water, which is the San Diego Bay at the mouth of the Telegraph Canyon Creek. The project area drains generally to the west, and is located within the 100-year floodplain (*Flood Insurance Rate Map 06073C1694F*, FEMA, June 1997).

The Sweetwater hydrologic unit is an elongated northeasterly trending strip with an area of about 596 square kilometers (230 square miles). The Sweetwater River traverses it along its length. The annual precipitation varies from less than 28 centimeters (11 inches) at the coast to about 89 centimeters (35 inches) inland (*Water Quality Control Plan for the San Diego Basin,* September 8, 1994).

Over 86% of the watershed is within unincorporated jurisdictions. The dominant land uses in the Sweetwater River watershed are urban (29%), open space/agriculture (22%), and undeveloped (49%). Approximately two-thirds of the land area categorized as urban is composed of residential communities. Approximately 300,000 people currently reside within the Sweetwater River watershed, and this amount is projected to increase to 365,000 by 2015. The most important watershed issues are related to the protection of municipal water supplies, and the protection and restoration of sensitive wetland and wildlife habitats (*Project Clean Water website,* 2005).

Between the headwaters and the outlet to San Diego Bay, the watershed contains a variety of habitat types including oak and pine woodlands, riparian forest, chaparral, coastal sage scrub, and coastal salt marsh. The upper watershed contains large undeveloped areas within the Cleveland National Forest and Cuyamaca Rancho State Park, the unincorporated communities of Pine Valley, Descanso, and Alpine, and the Viejas Indian Reservation. Unincorporated rural and suburban communities characterize the central part of the watershed. The urbanized lower portion of the Sweetwater watershed contains portions of several cities including San Diego, National City, Chula Vista, La Mesa, and Lemon Grove (*Project Clean Water website,* 2005).

2.0 WATER QUALITY ENVIRONMENT

2.1 Beneficial Uses

Although there are no beneficial uses for untreated storm water runoff, the beneficial uses for Lawson Valley Creek are included in Tables 2-1 and 2-2. These tables have been extracted from the *Water Quality Control Plan for the San Diego Basin (September 8, 1994).*

Municipal and Domestic Supply (MUN): Includes uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

Agricultural Supply (AGR): Includes uses of water for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.

Industrial Service Supply (IND): Includes uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, and oil well re-pressurization.

Industrial Process Supply (PROC): Includes uses of water for industrial activities that depend primarily on water quality.

Contact Water Recreation (REC1): Includes uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water skiing, skin and SCUBA diving, surfing, white water activities, fishing, or use of natural hot springs.

Non-contact Water Recreation (REC2): Includes the uses of water for recreational activities involving proximity to water, but not normally involving contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

Biological (BIOL): Includes uses of water that support designated areas or habitats, such as established refuges, parks, sanctuaries, ecological reserves, or Areas of Special Biological Significance (ASBS), where the preservation or enhancement of natural resources requires special protection.

Warm Freshwater Habitat (WARM): Includes uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.

Wildlife Habitat (WILD): Includes uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife, or wildlife water and food sources.

2.1.1 Inland Surface Waters

Inland surface waters for this hydrologic subarea have the following beneficial uses as shown on Table 2-1.

Table 2-1 Beneficial Uses for Inland Surface Waters

Hydrologic Unit Number	MUN	AGR	IND	PROC	REC1	REC2	WARM	BIOL	WILD
909.21	X	X	X	X	X	X	X	X	X

X = Existing beneficial use

2.1.2 Groundwater

Beneficial uses for groundwater in this hydrologic area are included in Table 2-2.

Table 2-2 Beneficial Uses for Groundwater

Hydrologic Unit	MUN	AGR	IND
Middle Sweetwater 909.20	X	X	X

X = Existing beneficial use

2.2 303(d) Status

According to the 2002 Clean Water Act 303(d) lists published by the California State Water Resources Control Board, there are no impaired water bodies associated with this project. The nearest impaired water body is the San Diego Bay shoreline (in hydrologic unit 909.12), which is affected by bacteria indicators. The San Diego Bay shoreline is approximately 35.4 kilometers (22 miles) from the project site.

3.0 CHARACTERIZATION OF PROJECT RUNOFF

3.1 Existing and Post-Construction Drainage

Drainage information was compiled through field investigation and also from the *Hydraulic*

Analysis and Revetment Design for the Lawson Valley Road Bridge over Lawson Valley Creek (West Consultants, July 2004).

Site drainage from the project area will change slightly from the existing patterns. Flow from the roadway will drain to the riverbed via new and existing overside drains, and the width of the bridge will be increased by approximately 1 meter (3-4 feet). The increased width will capture more rainfall and thus increase the volume and velocity of stormwater flows from the bridge deck. Using the rational method and rainfall intensity data from the 2003 County of San Diego Hydrology Manual, stormwater flows for the project impact area (including the bridge and new roadwork) were calculated. Please note that these calculations do not represent flow rates for the entire hydrologic basin area; rather, they approximate the difference between pre- and post-construction flows in the immediate vicinity of the bridge. Table 3-1 shows the approximate flows associated with the 85th Percentile, 2- and 10-year storms from the existing and the new bridge.

Table 3-1 Stormwater Flow Calculations for the Existing and Proposed Bridge

Storm Type	85th Percentile	2-year	10-year
Existing Bridge flow $m^3/s/(cfs)$	0.02/0.80	0.063 (2.21)	0.092 (3.24)
Proposed Bridge flow $m^3/s/(cfs)$	0.03/0.93	0.066 (2.33)	0.097 (3.42)

The proposed bridge's increased width and length will capture more rainfall and thus increase the volume and velocity of storm water flows from the bridge deck; however, these increases will not be significant when compared to the 50-year flood discharge (186.04 m^3/s (6,570 cfs) and the 100-year flood discharge (254.85 m^3/s)(9,000 cfs) as calculated by West Consultants (July 2004). The additional storm water that will fall onto the proposed bridge currently sheet flows into and falls directly onto Lawson Valley Creek, which means the overall volume of storm water that falls onto the site and flows to Lawson Valley Creek will not change.

3.2 Pollutants of Concern

Table 3-2 shows potential secondary pollutants of concern, based on the bridge/roadway land use classification.

Table 3-2 Anticipated and Potential Pollutants Generated by Land Use Type

Project Categories	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease
Streets, Highways and Freeways	X	P(1)	X	X(4)	X	P	X

P = Potential pollutant (including solvents)
X = Anticipated pollutant
(1) = A potential pollutant if landscaping exists on site

(4) including petroleum hydrocarbons
(5) including solvents

Sediments are soils or other surficial materials eroded and then transported or deposited by the action of wind, water, ice, or gravity. Sediment can increase turbidity, clog fish gills, reduce spawning habitat, lower young aquatic organisms' survival rates, smother bottom-dwelling organisms, and suppress aquatic vegetation growth. Increased traffic flow may result in larger amounts of sediment deposition by vehicles on the bridge; however, this project is not intended to accommodate future growth in the area of potential effect and an increase in traffic or sediment deposition is not anticipated.

Nutrients are inorganic substances, such as nitrogen and phosphorus. They commonly exist in the form of mineral salts that are either dissolved or suspended in water. Primary sources of nutrients in urban runoff are fertilizers and eroded soils. Excessive discharge of nutrients to water bodies and streams can cause excessive aquatic algae and plant growth. Such excessive production, referred to as cultural eutrophication, may lead to excessive decay of organic matter in the water body, loss of oxygen in the water, release of toxins in sediment, and the eventual death of aquatic organisms. There may be some landscaping within the vicinity of the bridge and small amounts of fertilizer may be used to establish vegetation.

Metals are raw material components in non-metal products such as fuels, adhesives, paints, and other coatings. At high concentrations, certain metals can be toxic to aquatic life; however, high concentrations of metals are not anticipated at the project site.

Organic compounds are carbon-based compounds found in pesticides, solvents and hydrocarbons. Organic compounds (other than the roadway surface) are not anticipated to be present in large quantities.

Trash and debris are general waste products on the landscape. Excess organic matter can create a high biochemical oxygen demand or promote septic conditions. Large amounts of trash are not anticipated to be present on the bridge.

Oxygen-demanding substances include biodegradable organic material as well as chemicals that react with dissolved oxygen in water to form other compounds. The oxygen demand of a substance can lead to depletion of dissolved oxygen in a water body and possibly the development of septic conditions. Large amounts of oxygen-demanding substances are not anticipated post-construction.

Oil and grease sources include petroleum hydrocarbon products, motor products from leaking vehicles, esters, oils, fats, waxes, and high molecular-weight fatty acids. Elevated oil and grease content can decrease the aesthetic value of the water body, as well as the water quality. It is not anticipated that oil and grease concentrations will increase post construction or have a significant impact on the river water quality.

3.3 Floodplains

The project area drains generally to the west, and is located within the 100-year floodplain (*Flood Insurance Rate Map 06073C1694F*, FEMA, June 1997). A hydraulic analysis will be performed as part of bridge design and will dictate the height of the bridge necessary to convey flood flows, specifically the 100-year flood. Increasing the effective area within the bridge section will alleviate flooding in the area and will most likely remove the bridge and adjacent roadway from the floodplain. By preparing a Letter of Map Revision to FEMA, the County can remove this area and structure from the floodplain. The LOMR cannot be completed until the final hydraulic analysis is completed.

3.4 Groundwater Impacts

The increase in impervious area from the project is relatively small (less than 5000 square feet) and will therefore have little to no impact on the existing groundwater table.

3.5 Post-Construction Conditions of Concern

Post-construction conditions of concern from development are changes to a project site's hydrologic regime that have the potential to permanently impact downstream channels and habitat integrity. Since the drainage area around the project site will not change, storm water flow volumes through the project site should not change. Additionally, since the proposed improvements do not significantly increase the amount of impervious surface or affect infiltration rates within the drainage area and downstream habitat, post-construction conditions of concern are not anticipated.

4 BMP SELECTION DURING CONSTRUCTION

To ensure water quality during the Lawson Valley Road Bridge replacement, BMPs must be implemented during construction. A Stormwater Pollution Prevention Plan will be prepared prior to construction that includes a detailed BMP plan and specifications for implementing the required BMPs. Potential types of temporary BMPs that might be implemented include the following:

- Silt fence
- Street sweeping and vacuuming
- Stockpile management (for erosion control)
- Stabilized construction entrance/exit
- Paving and grinding operations
- Gravel bag berm
- Material delivery and storage
- Fiber rolls
- Storm drain inlet protection
- Solid waste management (litter and trash)
- Dewatering operations
- Water conservation practices
- Concrete waste management
- Sandbag barrier
- Spill prevention and control

Construction BMPs will be selected, constructed and maintained so as to comply with all applicable ordinances and guidance documents.

5 SUMMARY/CONCLUSIONS

This WQR was prepared in accordance with the County's Watershed Protection, Stormwater Management, and Discharge Control Ordinance and the County's Stormwater Standards Manual. This WQR has evaluated and addressed the potential pollutants associated with the proposed project and their effects on water quality.

Due to the increased width and alignment of the new bridge and associated roadway, stormwater flow from the project area will increase by approximately 5% (from Table 3-1). This higher flow can potentially transport more roadway pollutants than the existing amount of runoff; however, these pollutants are not anticipated to be present in sufficient concentrations to impact the water quality of Lawson Valley Creek.

The increase in impervious pavement can potentially lead to more roadway pollutants being collected and discharged to the creek when compared to the existing runoff; however, these pollutant concentrations are not anticipated to increase significantly since the proposed two-lane bridge is designed to replace the existing two-lane bridge, rather than increase the overall amount of local traffic. It is not anticipated that the increase in flow will significantly increase erosion in the creek, because rock slope protection will be installed where storm water flow exits the roadway.

FIGURES

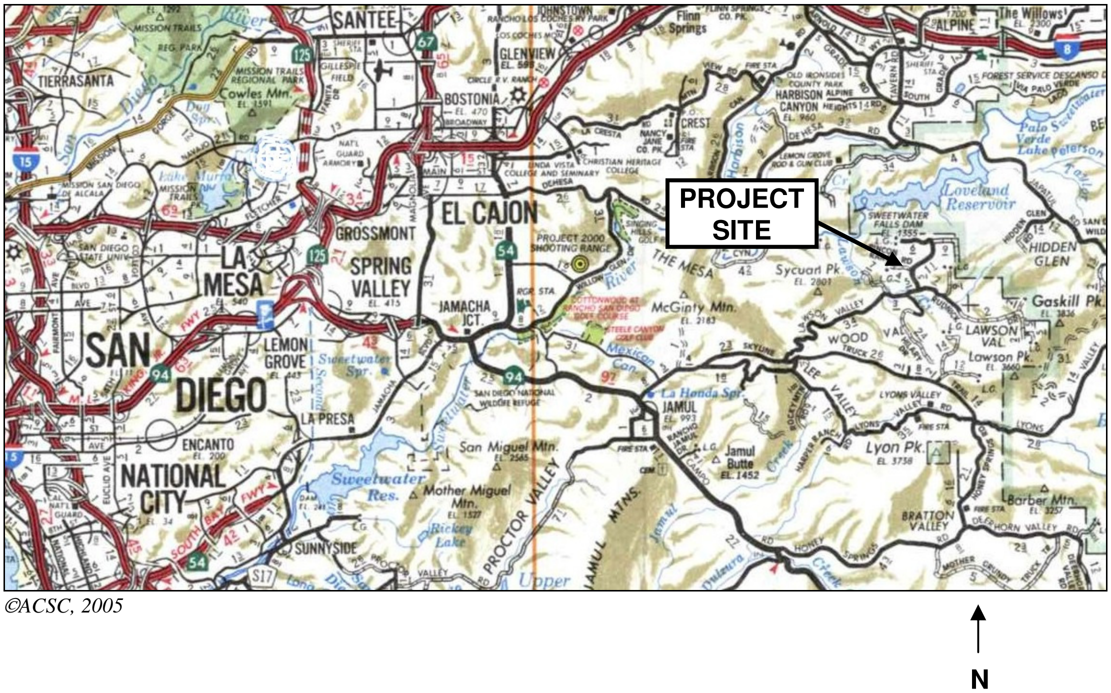

FIGURE 1 – SITE LOCATION MAP
(NOT TO SCALE)

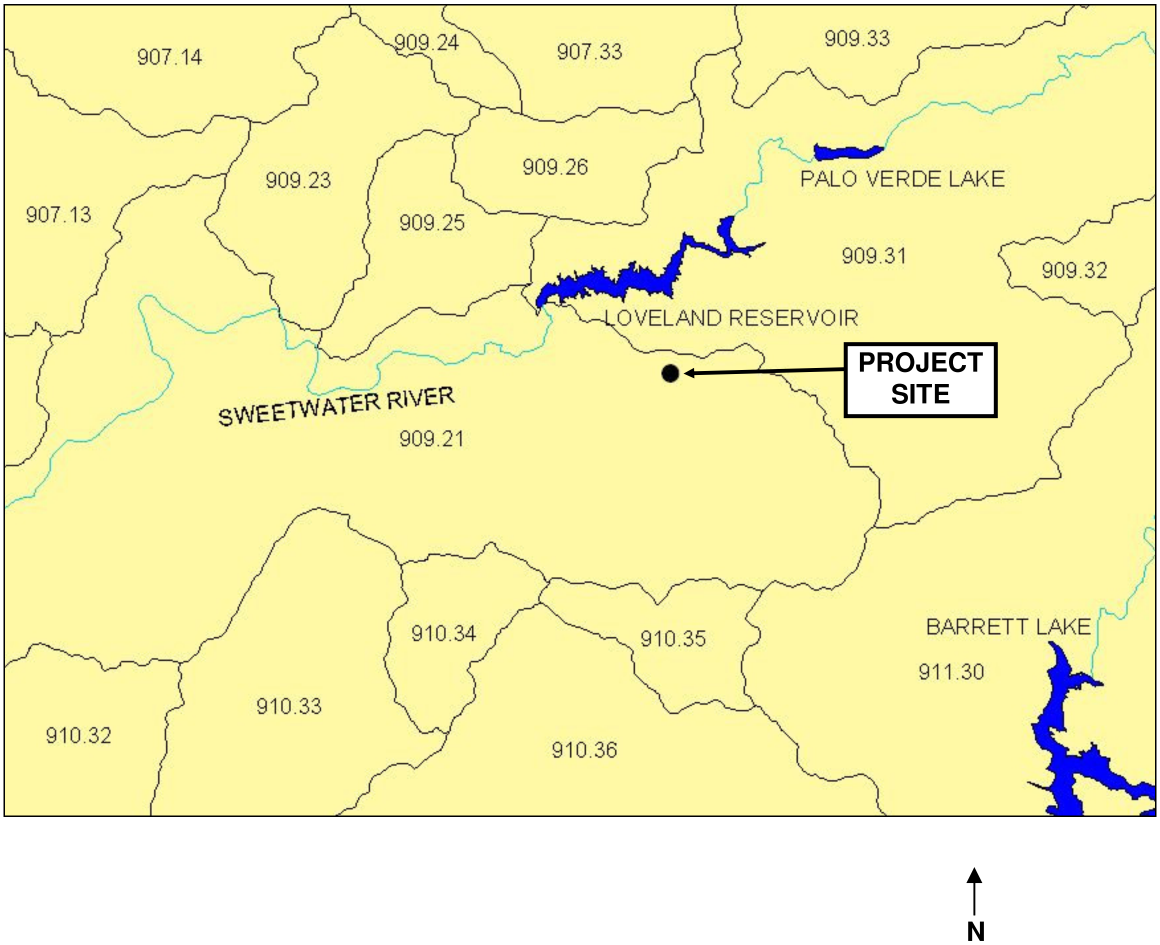

FIGURE 2 – REGIONAL HYDROLOGIC SUBAREAS

Source: Water Quality Control Plan for the San Diego Basin (September, 1994)

(NOT TO SCALE)

PICTURES

Photo 1 – View east along Lawson Valley Road. The terrain slopes down towards the bridge.
Photo 2 – View west along Lawson Valley Road. Terrain slopes towards the bridge.

Photo 3 – Existing bridge looking upstream. Note rock slope protection on both banks.

Photo 4 – Upstream south bank. Note concrete slope protection and exposed rock in the creek bed.

Photo 5 – Upstream view of channel and vegetated banks.

Photo 6 – Downstream view of existing channel and banks.